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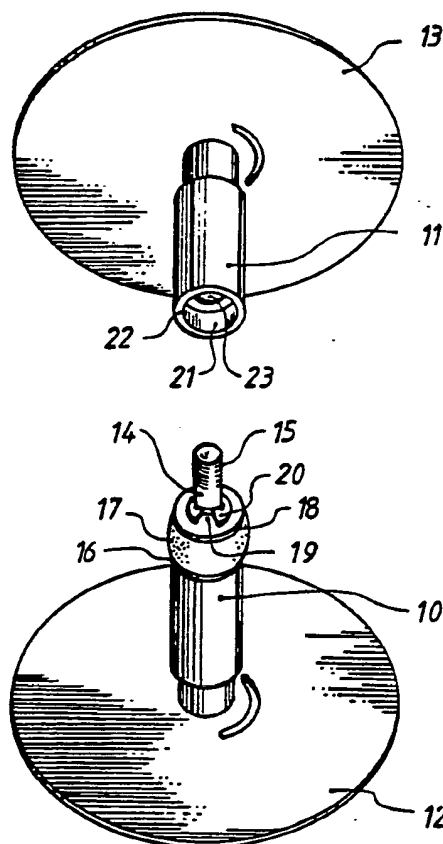
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(58) Field of search
UK CL (Edition J) F2U
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(54) Expandable paper roll support

(57) The disclosure relates to a support for a roll of paper or similar material. The support comprises a shaft divided into two portions (10 & 11). The inner end of the portion (11) is internally threaded to receive an externally threaded boss (14) on the portion (10). The boss (14) carries a rubber ring (17) located between two washers (16 & 18). When the two portions (10 & 11) are assembled, the ring (17) is squeezed between the washers (16 & 18) so that its diameter expands until it grips the interior of the paper roll.

Fig1.



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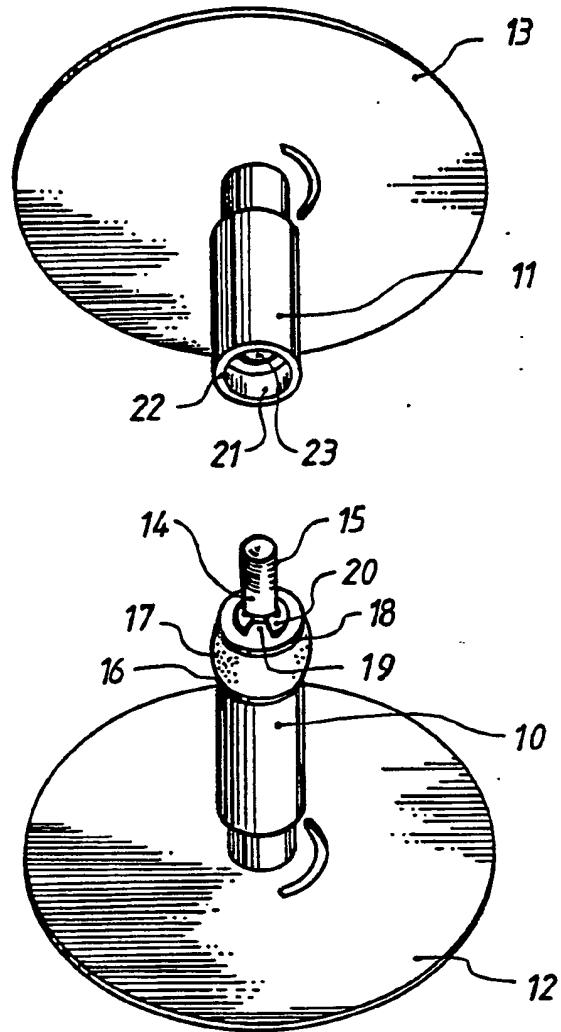


Fig 1.

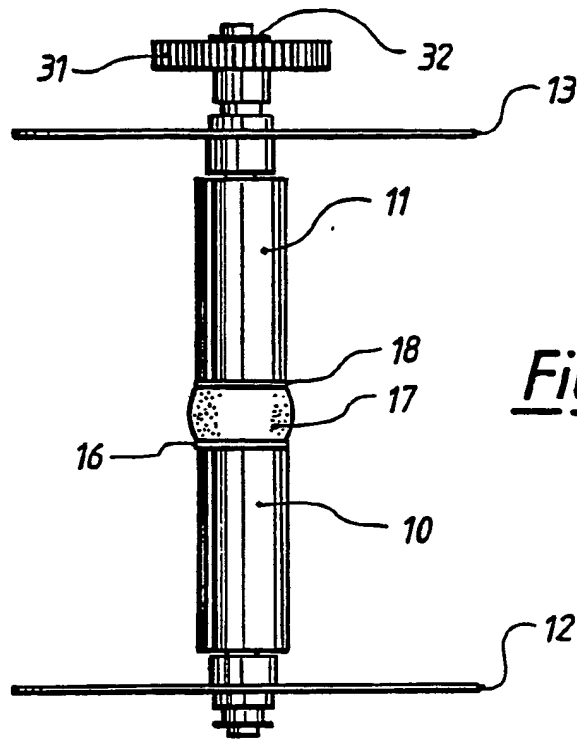


Fig 2.

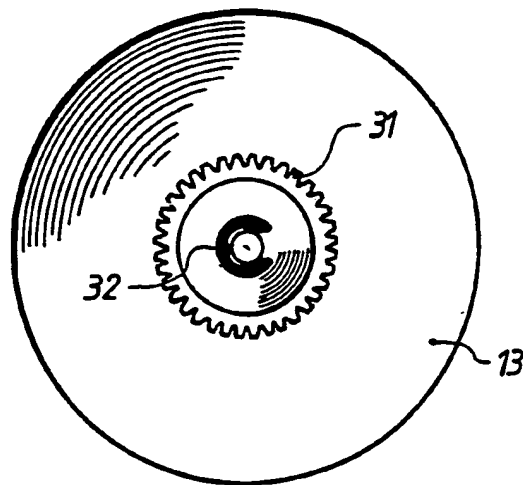


Fig 3.

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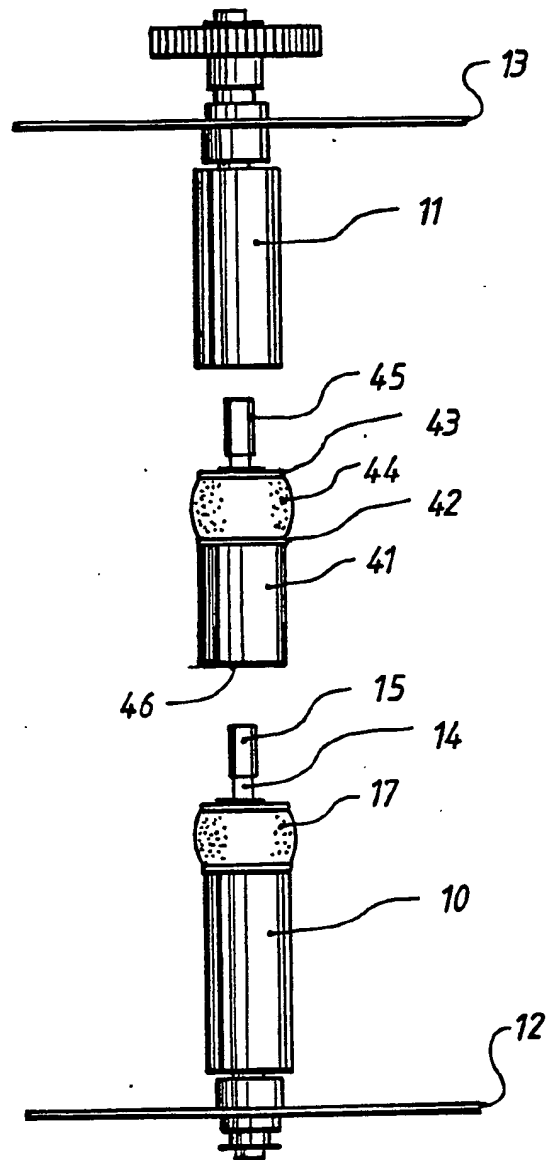


Fig 4.

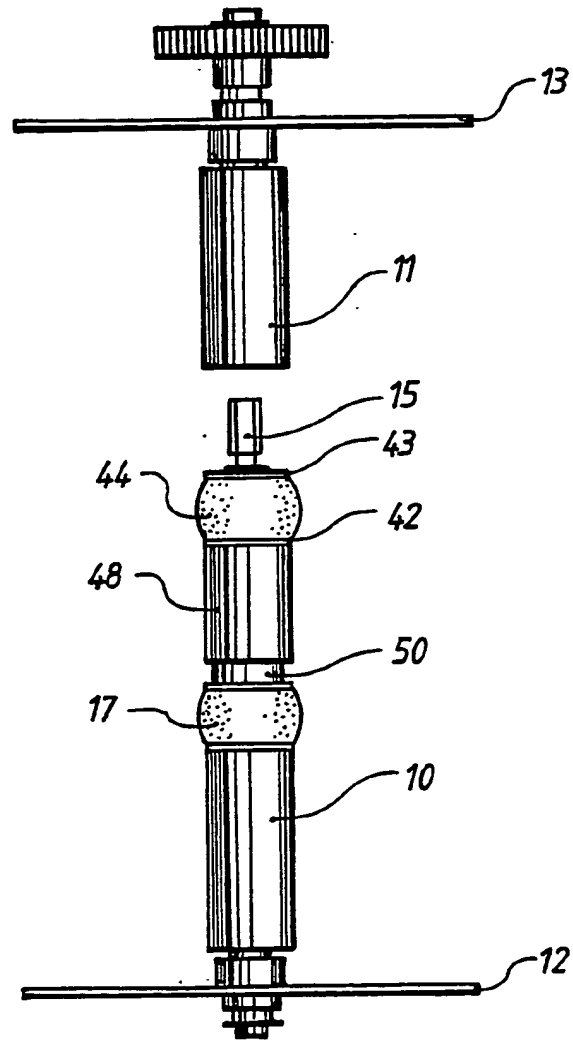


Fig 5.

EXPANDABLE PAPER ROLL SUPPORT

This invention relates to supports for rolls of material.

In many different types of apparatus a roll of flexible material such as paper has to be supported on a rotatable shaft. Particularly in the case of paper, the roll is normally wound on a tube which may consist,
5 for example, of cardboard or of a synthetic resin material. In some cases the tube may be allowed to rotate freely on the shaft, for example while material is paid off from the roll. In other cases, however, it is necessary that the tube carrying the roll of material should rotate with the shaft. This is particularly the case when, during operation of the
10 apparatus, the material has to be wound on to the roll. However it is also true in other cases in which the material is required to be paid out at a controlled rate from the roll.

In the past, when it has been necessary for the roll of material to rotate with the shaft, various different methods have been used to lock
15 the tube to the shaft. In one system, end cheeks have been provided on the shaft and these have been urged towards each other to grip the ends of the tube, either by means of a spring or by means of a positive compression device such as a screw. In other systems a slot has been provided in one or both ends of the tube and this slot has engaged with a corresponding ridge
20 on the cheek or cheeks. In yet another system, spring means have been provided on the shaft itself to grip the interior of the tube. These have frequently been unsatisfactory because of variations in the internal diameter of the tube. Also difficulty has sometimes been experienced in mounting the tube on an axle provided with spring means, in that the spring
25 has caught in the interior of the tube, particularly in the case of cardboard tubes.

It is an object of the present invention to provide a system for supporting a roll of material on a shaft, which system avoids the

disadvantages of the known systems.

In accordance with the invention the shaft includes at least two portions, one of which is internally threaded to receive an externally threaded boss on one end of the other portion so that the two portions can be assembled coaxially. The boss carries an annular elastomeric member, the external diameter of which, when the two portions are not assembled, is less than the internal diameter of the roll, whereas, when the two portions are assembled, pressure on the annular member from the adjacent ends of the two shaft portions increases its external diameter at least to the internal diameter of the roll.

It is to be understood that in this definition of the invention the word "roll" is being used to refer both to an unsupported roll of material and also to a roll of material supported on a tube. Thus in the case of a roll supported on a tube, the internal diameter referred to in the preceding paragraph is the internal diameter of the tube.

The elastomeric material of the annular member is preferably natural or synthetic rubber, but may be any other suitable material which, when compressed axially, will expand radially and will return to its initial dimensions when the axial pressure is removed.

In some cases, and especially when the axial length of the roll is relatively large, it will be desirable to provide two or more elastomeric annular members in the shaft so that gripping pressure is applied evenly along the length of the interior of the roll or the tube on which it is mounted. In such cases the shaft is of course divided into the appropriate number of portions to accommodate the required number of annular members.

In the drawings:-

Figure 1 is an exploded view of a roll support in accordance with the invention showing the two portions of the shaft separated;

Figure 2 is a plan view of the support of Figure 1 in the assembled position;

Figure 3 is an end view of the support illustrated in Figure 2;

Figure 4 is a plan view of a second embodiment of the invention in which two annular members are provided; and

Figure 5 is a plan view of a third embodiment in which two annular members
5 are also provided.

Referring to Figure 1, it will be seen that the shaft comprises a first portion 10 and a second portion 11. An end cheek 12 is secured to the portion 10 and an end cheek 13 is secured to the portion 11. The end of the portion 10, remote from the cheek 12, is provided with a boss 14. The
10 inner end of the boss 14 is smooth, while the outer end is threaded as shown at 15. The inner end of the boss 14 carries a rigid washer 16, an annular elastomeric member 17 and a further rigid washer 18. A groove 19 is provided in the smooth part of the boss 14, and the two washers 16 and 18 and the annular member 17 are retained in position by means of a circlip 20. As can
15 be seen, the external diameter of the circlip 20 is less than that of the washer 18.

The end of the shaft portion 11, remote from the cheek 13, is provided with a recess 21 forming an annular shoulder 22. The internal diameter of the annulus is greater than the external diameter of the circlip
20 20, but less than the external diameter of the washer 18. The end of the portion 11, remote from the cheek 13, is provided with a further bore 23 which is threaded to cooperate with the thread 15 on the boss 14. Thus the two shaft portions 10 and 11 can be assembled coaxially by providing relative rotation between the two portions. As a result of this relative
25 rotation the threaded portion 15 of the boss 14 is drawn into the bore 23, and the circlip 20 enters the recess 21. However the washer 18 cannot enter this recess, and butts up against the shoulder 22. Thus continued relative rotation of the two shaft portions forces the washer 18 towards the washer 16 and thus compresses the annular member 17. The axial pressure on
30 the member 17 causes its external diameter to increase and thus grip the

interior of the tube or roll of material which is mounted on the two shaft portions 10 and 11.

Figure 2 is a plan view of the support illustrated in Figure 1, with the two shaft portions assembled. It can be seen that a drive cog 31 is provided on the shaft portion 11 and is held in place with a circlip 32. A flat, or spline, is provided on the shaft portion 11 to ensure that the portion rotates with the cog 31 so that the whole assembly can be driven. The end cheek 13 may be similarly secured to the shaft portion 11 or it may be allowed to rotate relative thereto. To facilitate the production of relative rotation between the two shaft portions 10 and 11 it is, however, desirable that the end cheek 12 should be locked to the portion 10.

Figure 3 is an end view of the support shown in Figure 2 illustrating the cog 31 and the circlip 32.

Figure 4 illustrates an embodiment of the invention generally similar to that illustrated in Figures 1 to 3 except that an intermediate shaft portion 41 is included between the two shaft portions 10 and 11. The intermediate portion 41 is provided with washers 42 and 43 cooperating with an annular elastomeric member 44. The portion 41 also has a threaded boss 45 which can be inserted into a threaded bore in the open end of the portion 11. Similarly the lower end 46 of the intermediate portion 41 is designed in the same way as the open end of the portion 11 to receive the threaded portion 15 of the boss 14 on the shaft portion 10.

It will be seen that with the arrangement shown in Figure 4, the two annular members 17 and 44 will grip the interior of the roll of material, or the tube on which the roll is carried, when relative rotation is provided between the portions 10 and 11. Normally, for ease of assembly, it will be desirable before putting the roll of material in place to attach the intermediate portion 41 to one or other portions 10 and 11 without applying sufficient pressure to increase the diameter of either of the annular members.

Figure 5 shows a plan view of a third embodiment of the invention in which two annular members 17 and 44 are again provided. The embodiment of Figure 5 is generally similar to that illustrated in Figure 4 except that the first member 10 is retained as a single, integral part and the intermediate shaft portion 41 is replaced by a sliding sleeve 48 free to slide on a cylindrical portion 50 of the first member 10, between the annular elastomeric member 44 and the annular elastomeric member 17. The visible gap between the sliding sleeve 48 and the cylindrical shaft 50 on the first member 10 is exaggerated in Figure 5 for purposes of illustration.

5 As the second member 11 is screwed on to the first member 10, so the sliding sleeve 48 is urged downwards by the elastomeric member 44 against the elastomeric member 17 so that both are compressed and increase their respective radii.

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It is to be understood that, whereas Figures 4 and 5 have shown two annular elastomeric members 17 and 44, three or more elastomeric members can be provided, being compressed either as illustrated in Figure 4, or as shown in Figure 5, or by a combination of the methods shown and described with reference to Figures 4 and 5.

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CLAIMS

1. A support for a roll of material comprising a shaft, the external diameter of which is less than the internal diameter of the roll, characterised in that said shaft includes at least two portions, one end of one of which is internally threaded to receive an externally threaded boss on one end of the other portion so that the two portions can be assembled coaxially, and in that said boss carries an annular elastomeric member, the external diameter of which, when the two portions are not assembled, is less than the internal diameter of the roll, whereas, when the two portions are assembled, pressure on the annular member from the adjacent ends of the two shaft portions increases its external diameter at least to the internal diameter of the roll.
2. A support according to Claim 1, wherein the annular member consists of natural or synthetic rubber.
3. A support according to Claim 1 or Claim 2, wherein, when the two portions are not assembled, the external diameter of the annular member is substantially the same as that of the shaft.
4. A support according to any of the preceding claims, wherein the outer end of the boss is threaded, whereas the inner end is smooth and carries the annular member between a pair of rigid washers.
5. A support according to Claim 4, wherein said washers and said annular member are retained in position on said boss by means of a circlip engaged in a corresponding groove in the boss.
6. A support according to Claim 5, wherein said one end of said one shaft portion includes a recess adapted to receive said circlip.
7. A support according to any of the preceding claims, including at least one intermediate shaft portion between said two shaft portions, the, or each, intermediate shaft portion being provided with an externally threaded boss on one end and an internal thread on the other end so that

said shaft portions and said intermediate portion or portions can all be assembled coaxially and wherein the boss on the, or each, intermediate portion carries an annular elastomeric member, the external diameter of which can be increased when the various portions are assembled.

5 8. A roll support substantially as hereinbefore described with reference to, and as illustrated in, Figures 1 to 3 of the accompanying diagrammatic drawings.

9. A roll support substantially as hereinbefore described with reference to, and as illustrated in, Figure 4 of the accompanying diagrammatic
10 drawings.

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